

### **REMARKS**

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1-39 are presently active in this case. The present Amendment amends Claims 2, 5, 17 and 30 and adds new Claims 35-39 without introducing any new matter.

The outstanding Office Action rejected Claims 1, 8-10, 12 and 18 under 35 U.S.C. §102(e) as anticipated by Yeo et al. (U.S. Patent Application Publication No. 2005/0036184, herein "Yeo"). Claims 7, 11, 19-26 and 32 were rejected under 35 U.S.C. §103(a) as unpatentable over Yeo in view of Pierrat et al. (U.S. Patent Application Publication No. 2005/0007567, herein "Pierrat").

Claims 2-6, 13-17 and 27-31 were indicated as allowable if rewritten in independent form. Applicants acknowledge with appreciation the indication of allowable subject matter. In response, Claims 2 and 5 are amended to be in independent form by including all the features of independent Claim 1, and are therefore now in condition for allowance.

Applicants wish to thank the Examiner Chacko-Davis for the courtesy of an interview granted to Applicants' representative on May 24, 2005, at which time the outstanding issues in this case were discussed. Arguments similar to the ones developed hereinafter were presented and the Examiner indicated that she would reconsider the outstanding grounds for rejection upon formal submission of a response.

To correct minor formalities, Claim 17 is amended to be dependent upon Claim 10 instead of Claim 5. Claim 30 is amended to recite "dispense" instead of "dispensing." Since these changes are only of clerical nature, they are not believed to raise a question of new matter.

To vary the scope of protection recited in the claims, new Claims 35-39 are added. New Claims 35-37 recite a feature regarding a drying chamber, and depend upon independent

Claims 1, 10 and 21, respectively.<sup>1</sup> New Claims 38-39 recite a feature regarding thermal processing, and depend upon independent Claims 1 and 10, respectively.<sup>2</sup> These features find non-limiting support in the disclosure as originally filed and therefore do not raise any issue on new matter.<sup>3</sup>

In response to the rejection of Claims 1, 8-10, 12 and 18 under 35 U.S.C. §102(e) over Yeo, Applicants respectfully request reconsideration of this rejection and traverse the rejection, as discussed next.

Briefly recapitulating, Applicants' invention, as recited in Claim 1, relates to a method of transferring a pattern to a thin film of radiation-sensitive material on a substrate by using photolithography, wherein the method includes the steps of exposing the thin film to a radiation source in a liquid immersion lithography system; and the step of drying the substrate after the step of exposing in a liquid immersion lithography system before further processing of the thin film and the substrate. Independent Claims 10 and 21 recite similar features in the context of a method of treating an exposed thin-film on a substrate following a liquid immersion lithography (Claim 10) and a system for patterning a thin-film of radiation-sensitive material on a substrate for semiconductor manufacturing (Claim 21).

As explained in Applicants' Specification at page 6, paragraph 28-29 with corresponding Figure 1, Applicants' invention improves upon conventional methods of transferring a pattern to a thin film of radiation-sensitive material on a substrate using liquid immersion photolithography, because the drying of the substrate avoids non-uniformly distributed immersion fluid that affects non-uniform temperature distribution during any further processing. This leads to undesired non-uniform characteristics of the devices formed on the substrate. The claimed invention thus leads to improved liquid immersion lithography.

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<sup>1</sup> Finds non-limiting support in Applicants' Specification at page 8, paragraph 35, lines 1-2.

<sup>2</sup> Finds non-limiting support in Applicants' Specification at page 6, paragraph 28.

<sup>3</sup> See MPEP 2163.06 stating that "information contained in any one of the specification, claims or drawings of the application as filed may be added to any other part of the application without introducing new matter."

Turning now to the applied reference, the Yeo patent discloses an immersion lithographic system and method of performing immersion lithography without severe degradation of photoresist materials by reducing the swelling of photoresist when being in contact with the immersion fluid.<sup>4</sup> The outstanding Office Action states that Yeo is “thermally treating the substrate to remove the excess fluid on the layer.”<sup>5</sup> As discussed in the May 24<sup>th</sup> interview, however, Yeo performs a thermal treatment<sup>6</sup> to form a barrier layer over the photosensitive material to reduce swelling of the photosensitive material caused by diffusion of the immersion fluid.<sup>7</sup> This swelling occurs after the immersion of the substrate and the photosensitive material with the fluid. Accordingly, Yeo’s thermal treatment is done *before exposure* of the photosensitive material or applying a fluid on to the photosensitive material. Yeo is entirely silent on a step of drying the substrate from the fluid before further processing. Yeo’s thermal treatment is performed before the immersion fluid is applied, since a barrier layer is created to prevent swelling when the immersion fluid is in contact with the photosensitive material.<sup>8</sup> A thermal treatment to form a barrier layer on photosensitive material, as taught by Yeo, *is not* the drying of the substrate to remove an immersion fluid from said substrate before further processing.

For the reasons stated above, Yeo fails to teach the *drying said substrate* following said *exposing* to remove an immersion fluid from said substrate. Therefore, the applied reference Yeo fails to teach or suggest every feature recited in Applicants’ claims, so that Claims 1, 8-10, 12 and 18 are believed to be patentably distinct over Yeo. Accordingly, Applicants respectfully traverse, and request reconsideration of, the rejection based on Yeo.<sup>9</sup>

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<sup>4</sup> See Yeo in the Abstract and at page 1, paragraph 8-9.

<sup>5</sup> See the outstanding Office Action on page 3, lines 1-2.

<sup>6</sup> See Yeo at page 4, paragraph 54, lines 8-10.

<sup>7</sup> See Yeo at page 4, paragraph 53 and in corresponding Figure 2b and 6.

<sup>8</sup> See Yeo at page 4, paragraph 52-55.

<sup>9</sup> See MPEP 2131: “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference,” (Citations omitted) (emphasis added).

In response to the rejection of Claims 7, 11, 19-26 and 32 under 35 U.S.C. §103(a), over Yeo in view of Pierrat, Applicants respectfully request reconsideration of this rejection and traverse the rejection. Pierrat teaches that a portion of the lens that was in contact with the wafer could be immersed in liquid chemical capable of dissolving the resist residues, and then dried.<sup>10</sup> However, Pierrat does not dry the substrate to remove immersion fluid from the substrate as discussed above. Therefore, even if the combination of Yeo and Pierrat is assumed to be proper, the combination fails to teach every element of the claimed invention. Accordingly, Applicants respectfully traverse, and request reconsideration of, this rejection of Claims 7, 11, 19-26 and 32 based on these patents.<sup>11</sup>

Further, Applicants respectfully submit that neither Yeo nor Pierrat disclose the features of Applicants' dependent Claim 7. The outstanding Office Action states that Pierrat teaches Applicants' claimed baking of said substrate in order to promote acid diffusion in the thin film.<sup>12</sup> Pierrat teaches that the location where the image should be formed in the photoresist layer is depending on the resist processing characteristics.<sup>13</sup> Pierrat further teaches that "best image position can be attributed to differences in chemistry and to different processing conditions like for example, pre-bake time and temperature, post-exposure bake time and temperature."<sup>14</sup> Applicants submit that the different processing conditions of the photoresist such as pre-baking and post-exposure baking, as taught by Pierrat, *are not* baking of the substrate in order to promote acid diffusion in the thin film, as claimed by Applicants' dependent Claim 7.

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See also MPEP 2143.03: "All words in a claim must be considered in judging the patentability of that claim against the prior art."

<sup>10</sup> See Pierrat at page 7, paragraph 81, lines 5-8.

<sup>11</sup> See MPEP 2142 stating, as one of the three "basic criteria [that] must be met" in order to establish a *prima facie* case of obviousness, that "the prior art reference (or references when combined) must teach or suggest all the claim limitations," (emphasis added). See also MPEP 2143.03: "All words in a claim must be considered in judging the patentability of that claim against the prior art."

<sup>12</sup> See outstanding Office Action on page 4, lines 13-20.

<sup>13</sup> See Pierrat at page 5, paragraph 60, lines 12-17.

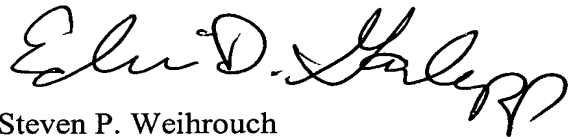
<sup>14</sup> See Pierrat at page 5, paragraph 60, lines 20-24.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal Allowance. A Notice of Allowance for Claims 1-32 and 35-39 is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicants' undersigned representative at the below listed telephone number.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.



Steven P. Weihrouch  
Attorney of Record  
Registration No. 32,829  
Edwin D. Garlepp  
Registration No. 45,330



**22850**

Tel. (703) 413-3000  
Fax (703) 413-2220  
SPW/EDG/NPS/vss  
I:\ATTY\NS\02312\241330US\241330US-AM1-DRAFT1.DOC